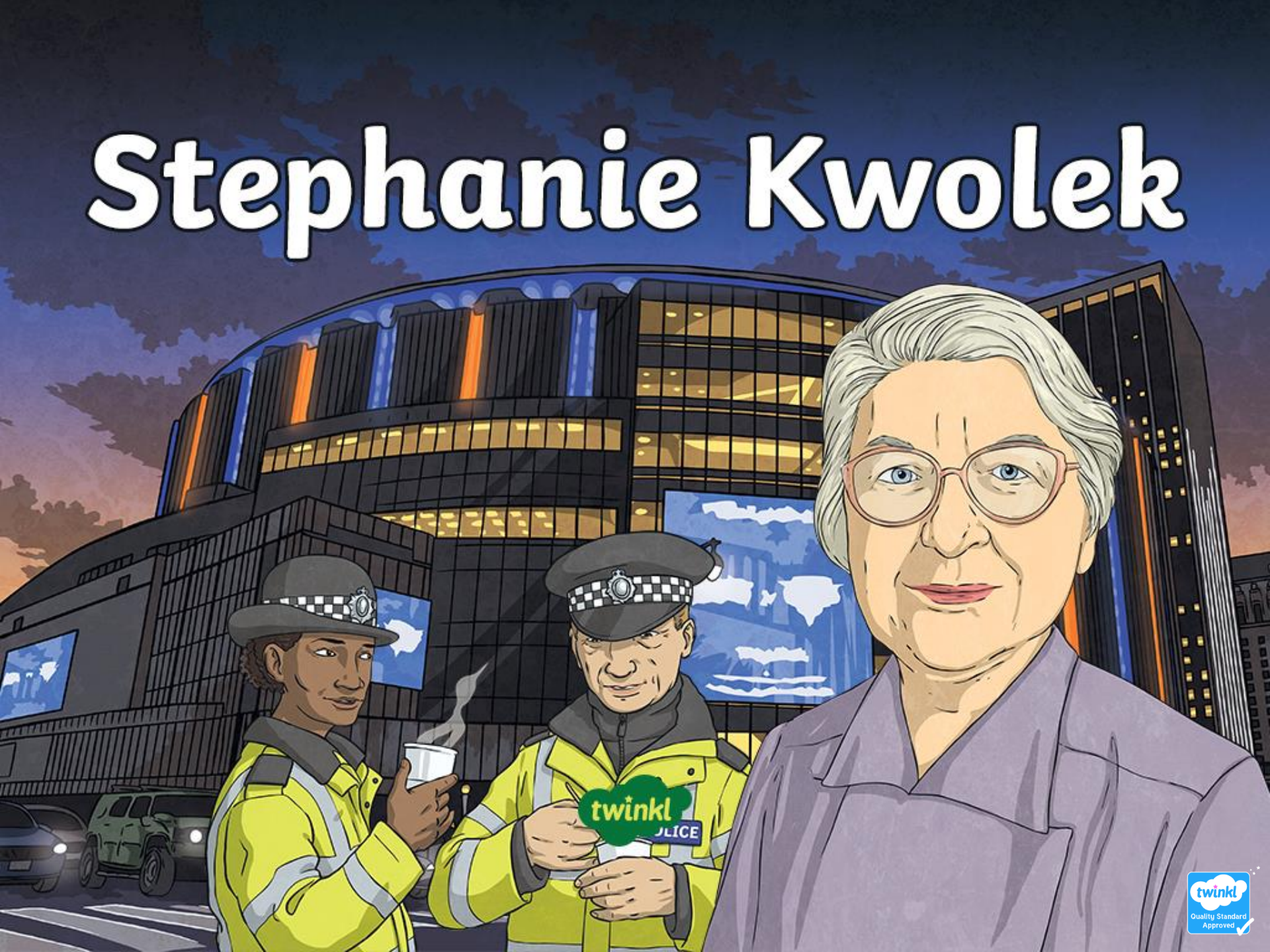
Science

Scientists and Inventors

Stephanie Kwolek



Aim

- To describe Stephanie Kwolek and her work with materials.
- To choose materials for jobs based on their properties.

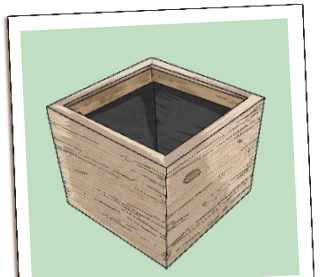
Success Criteria

- I can order facts about Stephanie Kwolek's life.
- I can identify uses for Kevlar.
- I can group and rank materials based on their hardness and weight.

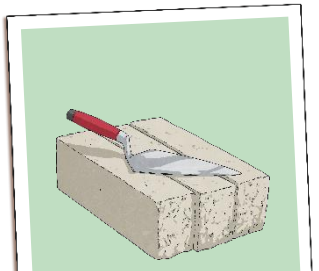
Best Material for the Job

Whole Class

Look at the materials listed. On your boards, write words to describe their properties.


wood

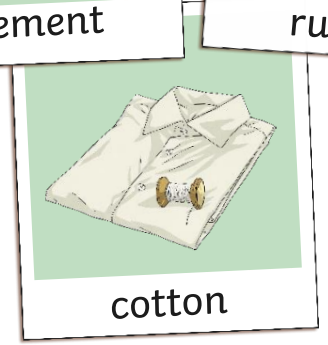
ceramics/pottery


cement

rubber

glass

iron


cotton

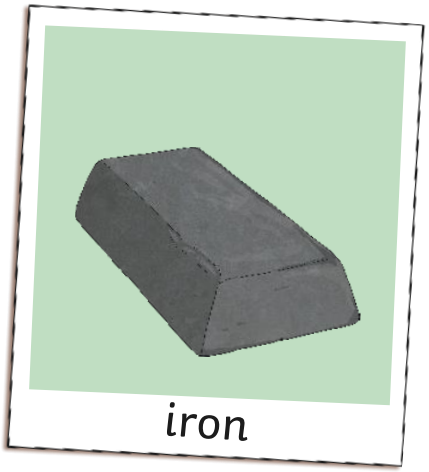
Why don't we use rubber bricks to make buildings?

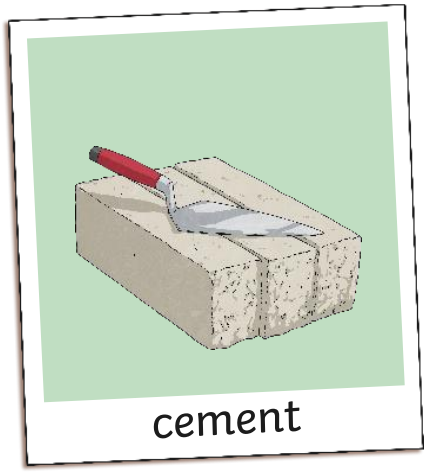
Think about their properties and the things these materials are commonly used for.

Hard Materials

What materials could be described as hard?
What jobs do we usually use them for?

wood


iron


cement

steel

Think about these materials and their uses, why are they good?

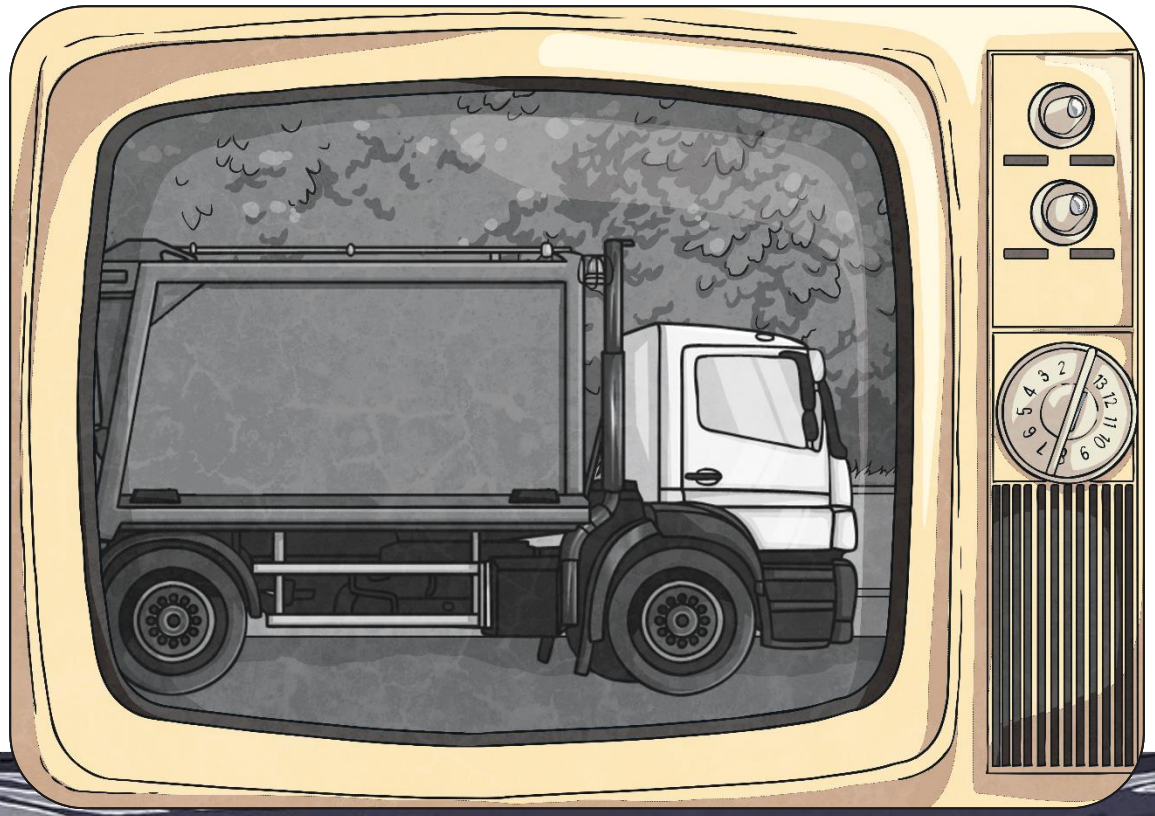
Is there any downside to any of these?

These materials we usually use for building large structures or machines. The biggest downside is that they are often very heavy (dense).

Stephanie Kwolek

Stephanie Kwolek was tasked with the job of finding a light material that was also very hard and strong.

Born in 1923 in Pennsylvania, USA, Kwolek's father was interested in science and passed this interest on to his daughter, who left university aged 23 with a degree in chemistry.

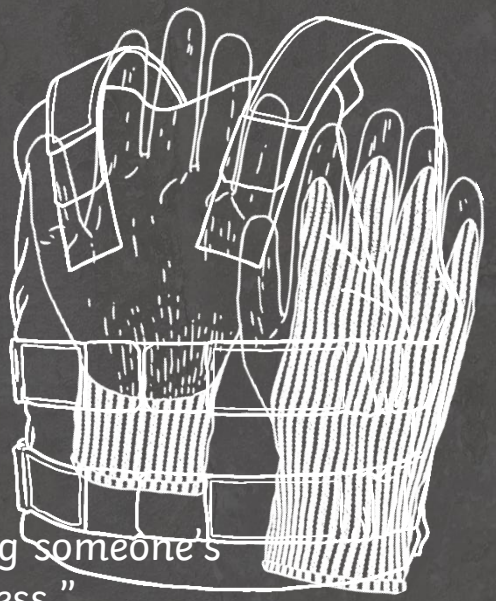


Stephanie Kwolek

Stephanie created a very hard plastic - in fact, it was 5 times stronger than steel of the same weight! It was also much, much lighter.

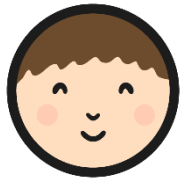
As well as in cars, Stephanie soon found that her invention was being used for another very special job. Because this material was exceptionally strong and lightweight, it could be used in bulletproof vests.

The invention was 'Kevlar'. It is still used today in the bulletproof clothing worn by police and armed forces, so it has saved an enormous number of lives. In addition, Kevlar has been included in the manufacture of protective gloves, diving equipment, boots, helmets and fireproof clothing.



"I don't think there's anything like saving someone's life to bring you satisfaction and happiness."

Materials Investigation

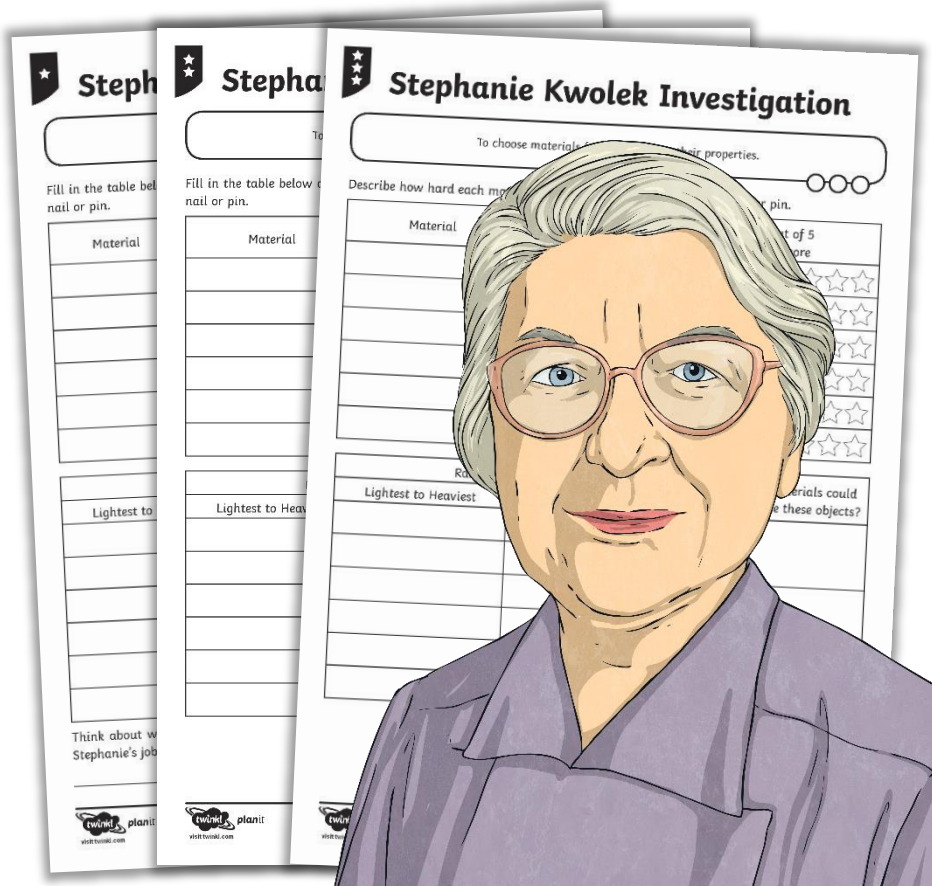


You are going to be given a selection of materials to test their hardness and weight and record these on the **Stephanie Kwolek Investigation Activity Sheet**.

Use a nail or pin to scratch the surface of your material and record how easy it is to make a mark on the surface, or even tear through it.

Then using scales, or just by comparison, list your materials from heaviest to lightest.

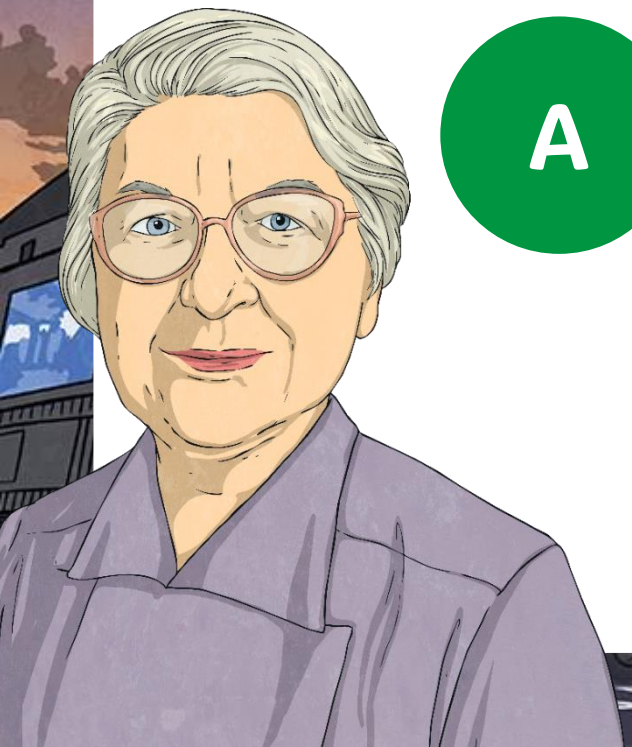
When you have finished your investigation, answer the questions on the bottom of the sheet.



Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q Where and when was Stephanie Kwolek born?



A Pennsylvania, USA, 1923

Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q Who inspired Stephanie to study sciences when she was young?

A Her dad (although he passed away when she was just 10).

Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q For what product was Stephanie originally trying to create a lighter, strong material?

A car tyres

Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q Why was Stephanie trying to make car tyres lighter?

A To reduce the amount of fuel used by vehicles with heavy tyres.

Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q What did Stephanie end up inventing? Can you remember its name?

A A light, strong plastic called Kevlar.

Kwolek Kwiz!

How much do you remember about Stephanie and her invention?

Q How strong is Kevlar, compared to steel?

A Five times stronger than steel of the same weight.

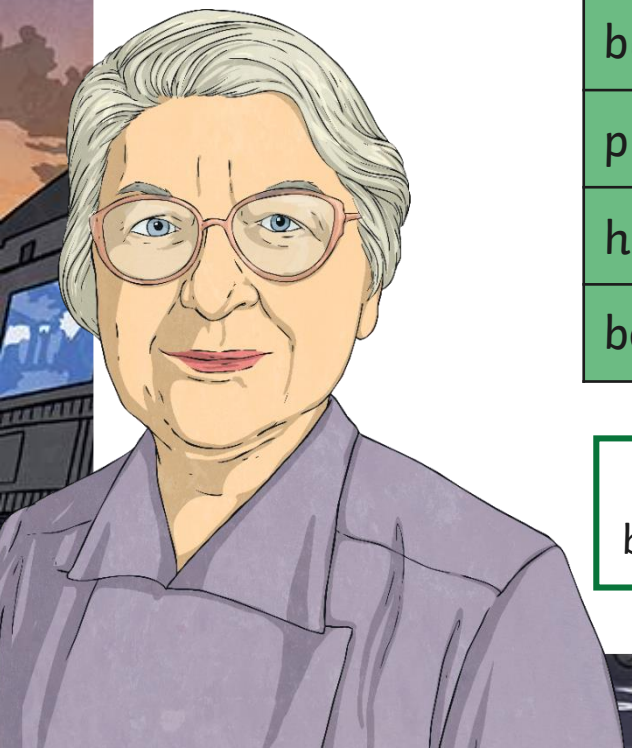
Kwolek Kwiz!

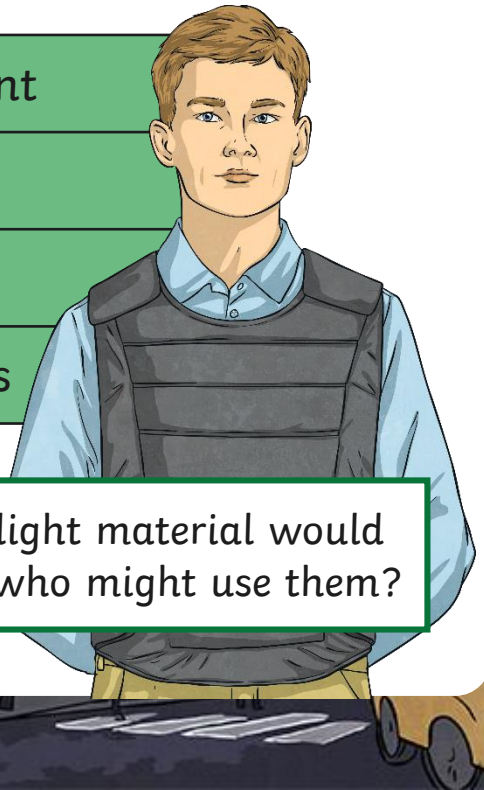
Whole Class

How much do you remember about Stephanie and her invention?

Q How many uses of Kevlar can you remember?

bulletproof vests	diving equipment
protective gloves	bike tyres
helmets	car tyres
boots	fireproof clothes





Can you explain why a very strong, light material would be useful for each of these items and who might use them?

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